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*Reply Bf. of Christy & Dells for*  
IN THE *Westinghouse et al*  
**Supreme Court of the United States.**

OCTOBER TERM, 1897.

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*No. 116.*

GEORGE WESTINGHOUSE, JR., ET AL., APPELLANTS,

vs.

BOYDEN POWER BRAKE COMPANY ET AL.,  
RESPONDENTS.

**Memorandum in Reply to New Boyden Brief on  
Third Argument.**

There are two points made in the new brief on behalf of the Boyden Company which are so different from any position heretofore advanced, and, as we trust to show, so erroneous, that we may be pardoned, we think, for requesting permission to file this brief reply.

These two positions are as follows:

*First.* That no brake is to be classed as a "quick-action" brake which has not the capacity of producing "full application of the last brake on a train of 50 cars within  $3\frac{1}{2}$  seconds from the operation of the engineer's controlling cock." This position is advanced on page 5 of the Boyden

brief, and is attempted to be supported by a citation in a note at the foot of that page from the proceedings of the Master Car Builders' Association of 1895 nothing of which appears in the record.

This proposition is repeated all through the argument, and, basing the definition of a "quick-action" brake upon this asserted formula, enunciated in 1895, seven years after the issue of the patent in suit, the brief proceeds to argue that the "quick-action" brake of the patent in suit, No. 360,070, is really not a "quick-action" brake at all, because, upon its first trial, in Burlington, in 1886, it only attained (owing to mechanical imperfections and disproportions) a serial rapidity of six seconds on a 50-car train.

We cannot assent to the correctness of a position which asserts that a standard of efficiency, formulated years after the date of the invention, and based upon its most improved and carefully made forms, is to be taken as a controlling factor in determining the position and value of the mechanism of the patent in suit.

This suit must be determined upon the *record* herein; and the value and position of Mr. Westinghouse's invention must be determined as of the date when it was made.

We have already shown that Westinghouse's invention has features of utility of controlling importance quite different from and independent of any *particular rate* of rapidity in serial action; and this fact will, we think, become still more evident in connection with our answer to the second erroneous position in the Boyden Company's brief.

*Second.* The second of the two positions in the Boyden Company's brief, which is both novel and erroneous, is this:

On pages 13 to 21 the brief proceeds to point out that between the time when the old automatic brakes used at the Burlington trials of 1886 failed to do satisfactory work, and

the time when Mr. Westinghouse made the invention in suit, which was patented in No. 360,070, March 29, 1887, certain intermediate valves were made, which are described in the testimony of Mr. H. H. Westinghouse, on pages 123 and 124 of the Record, and one of which purports to be illustrated opposite page 16 of the new Boyden Brief. These intermediate valves, it is contended, are to be considered as part of the state of the art prior to the patent in suit, and it is claimed that they tend to limit its scope and impair its position as a pioneer.

In connection with this part of the argument, we desire to call attention to the following facts:

1st. That, on page 16, the brief asserts that "The 'cut' opposite this page illustrates the arrangement described by Mr. Westinghouse."

We can only say that this "cut" is wholly imaginary. No such "cut" is found in the Record, and no structure is described of which the cut can be *fairly* treated as a proper illustration.

The "cut" is *not* the thing which Mr. Westinghouse describes. It adds, among other things, a piston K *to close the discharge port at the proper time*, which Mr. Westinghouse does *not* say was provided, and the presence of which is in conflict with the express statement of Mr. Westinghouse that the use of this experimental discharge resulted in "*a complete exhaustion of the train pipe.*" The significance of this gratuitous addition of piston K will appear later.

2d. The brief asserts on the same page (16) that the arrangement of the intermediate form of valve which operated to discharge air from the train pipe to the atmosphere "does not appear by any evidence in the case to have been the invention of Mr. George Westinghouse, Jr." As to this

last remark, we submit that the record shows exactly the contrary.

Mr. H. H. Westinghouse, in prefacing his description of the supplemental tests which were made, and which led up to the making of the invention of the patent in suit as a result of the failure of the automatic valves at Burlington in 1886, said (p. 122):

"An examination of the results obtained led George Westinghouse, Jr., to make investigations with a view to so changing the form of brake apparatus as to have the effect of operating with a *less interval of time* between the apparatus of the several cars, and also, if possible, provide for a *greater available force*, so as to arrest the motion of the train in a less distance than had been done in the 1886 Burlington trials."

He then proceeds to describe the two preliminary experiments relied upon by the Boyden counsel, viz., 1st (p. 123), the placing in the train pipe at regular intervals of "a form of delicately adjusted exhaust valve," which he says caused a nearly uniform application of all the brakes in "service" applications, but which were of such an "extremely delicate nature" as to render their practical use "extremely doubtful," and which merely "served to demonstrate *the direction of further experiment*;" and, 2d (p. 124), *some apparatus* arranged with an auxiliary valve controlling communication between the brake pipe and the atmosphere and operated by the final travel of a triple-valve piston, which while also quickening serial application resulted in "*a complete exhaustion* of the air from the train pipe at each triple valve."

Mr. H. H. Westinghouse then adds that these suggestive but imperfect experiments finally culminated in the device of the patent in suit, which embraced a *combination*, in one unitary structure, of mechanism for securing for *emergencies*

only, a greatly augmented brake force ("fully 20 per cent.") and a *controlled* quicker serial application of brakes. By *controlled* "quick action" we mean such action as can be caused to operate or remain inoperative at the will of the engineer, and can be applied and re-applied at will, without sacrificing the other necessary functions of a "service" use and graduating use and prompt release after application.

Mr. H. H. Westinghouse concludes his narration of the history of the experiments which led up to and culminated in the invention of the patent in suit by saying of them all (p. 125).

"The experiments and improvements and changes above described were carried on by the suggestion and under the direction of George Westinghouse, Jr."

It is difficult, therefore, for us to understand how the Boyden brief can assert so positively that the record does not show that the alleged intermediate forms were the work of Mr. George Westinghouse, Jr.

But whether they were or were not the work of Mr. George Westinghouse, Jr., is of no real importance, for they resulted, at the time, in nothing practical, and, as mere tentative experiments, they cannot be used to detract from the novelty or merit of Mr. Westinghouse's great invention embodied in the patent in suit. Nor can that invention be minimized by the erroneous assertion that nothing is a "quick-action" brake which does not apply the last brake on a 50-car train in three and one-half seconds.

Mr. Westinghouse's pioneership stands upon a foundation quite different from any mere *rate* of serial quickness of application.

Quickened serial application had been proposed by him in

his patent No. 217,838 seven years before. But *mere* capacity for quickened serial application is not enough. If it had been, it would have been practically utilized long before 1887. The long and heavy freight trains of the modern art, and which modern railway practice had rendered essential, required a brake of *augmented force held under control* for *emergency use* and also one possessing *controlled* quicker serial application.

Greater efficiency of the brake in the rare instances of emergency application, when life and property were in imminent peril, could not, however, be provided for at the sacrifice of the every-day capacity of the brake for "service" use. A brake which is more powerful and quicker in serial application would be a *useless* thing if those qualities were attained only at the sacrifice of the capacity for either delicate graduation or full "service" application at will, or of the power to instantly release the brake after it had been once applied.

A "quick action," which was *always* "quick action," would be an utterly useless brake; a more powerful brake, which must *always* be more powerful, would be an impractical thing.

Hence, neither the suggestion of patent No. 217,838, nor the tentative experiments made by Westinghouse, in his shop, in 1886, in his endeavor to devise *the successful* freight brake of the future, have any relation to the present invention, except to indicate how complicated and difficult the problem was which was solved by it.

A brake of augmented force in emergencies, and in emergencies *only*, and of quickened serial application, but which was not "quick action" *always*, but was under control, was the *desideratum*. A "quick action" which was not destructive of the most important functions of the brake for

ordinary "service" use and which did not depend upon mechanism too delicate to be practical, and which was so organized as not to prevent the brake being released after it had been once applied, was the thing which was required.

All these features are embodied in the invention and apparatus of the patent in suit. None of them are found in the prior patent, No. 217,838, nor practically embodied in the tentative experiments of Westinghouse himself which led up to the patent in suit.

An auxiliary discharge valve of such an "extremely delicate nature," as to make its practical use "extremely doubtful," did not solve the problem, nor did it add anything to the art.

The mere discharge of train-pipe air by a valve controlled by the triple-valve piston, but which, when once opened, resulted in "a complete exhaustion of the air from the train pipe at each triple valve," would be likely to be a valve which could not be released until the brake apparatus of the whole train was manipulated by the few train hands. Hence it added nothing to the art.

The "cut" opposite page 816 of the Boyden brief, and which purports to illustrate the experiment which Mr. H. H. Westinghouse described, *supplements* that description, by illustration of a complicated piston-operated aperture-closing valve (marked "K"), no suggestion of which is made in the record, nor is any description found of how it could be utilized to stop the discharge of air.

By discharging the vented air from the train pipe into the brake cylinder, as the result of the final movement of the piston of a triple valve, Westinghouse solved the complicated problem of "quick action," placed it under immediate control by the engineer, and accompanied it by aug-

mented train-stopping force combined with an *unimpaired* capacity of the apparatus for every function of ordinary use.

Until *all* these things were done, "quick action" was, for practical railroad purposes, unaccomplished.

George Westinghouse, Jr., did them all. He was absolutely the first to accomplish each one of three fundamental features of practical "quick action," viz:

1. Augmented power in emergencies, and in emergencies *only*.
2. *Controlled* quickened serial action, which could be had, or *not* had, at will.
3. "Quick action" with unimpaired capacity for all the necessities of "service" action.

The fact that, in his first apparatus, *one*, and *one only*, of his novel features—that of *controlled* quick serial action—was not *as rapid* as he himself afterwards made it, is a matter of no controlling importance.

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